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COMPUTER SCIENCE

NEWSLETTER

No. 88

Edited by C. Alan Ford

Date May 31, 1972

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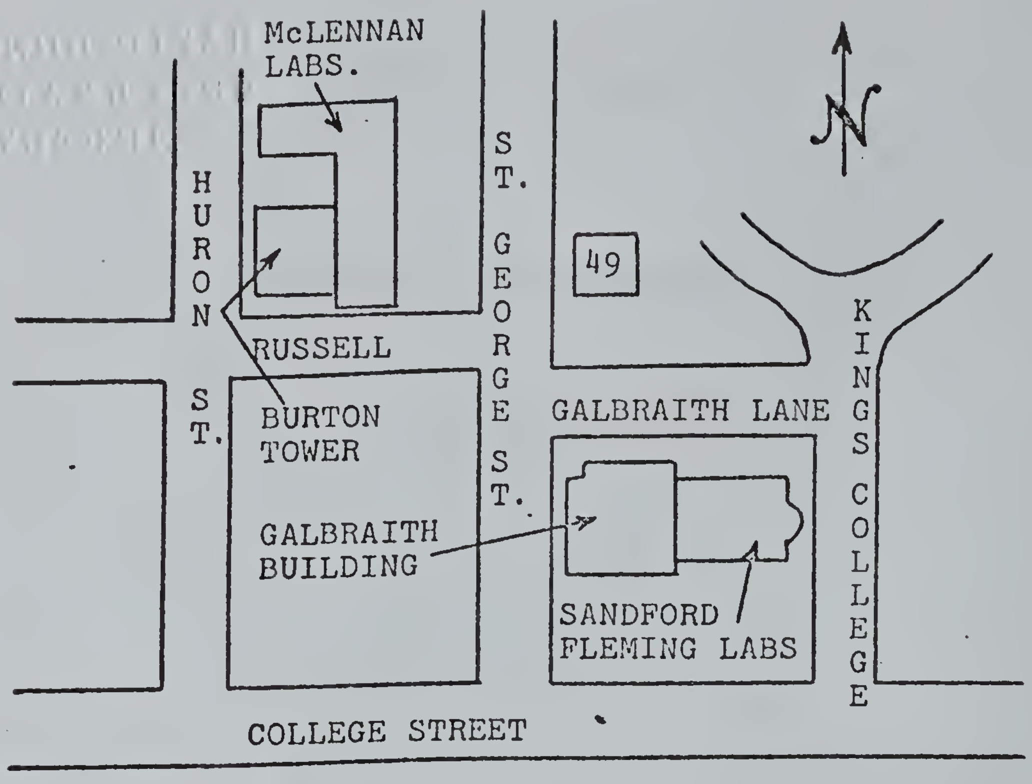
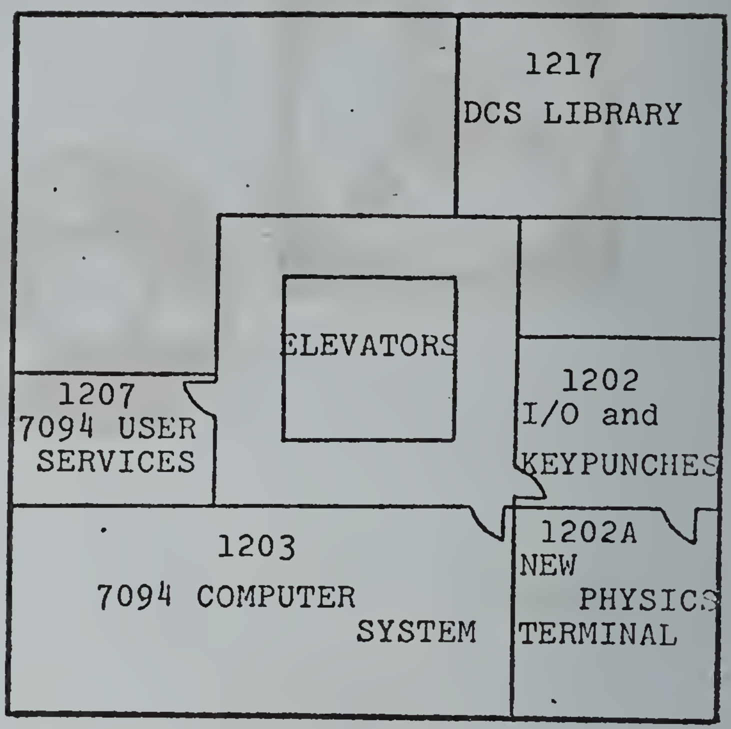
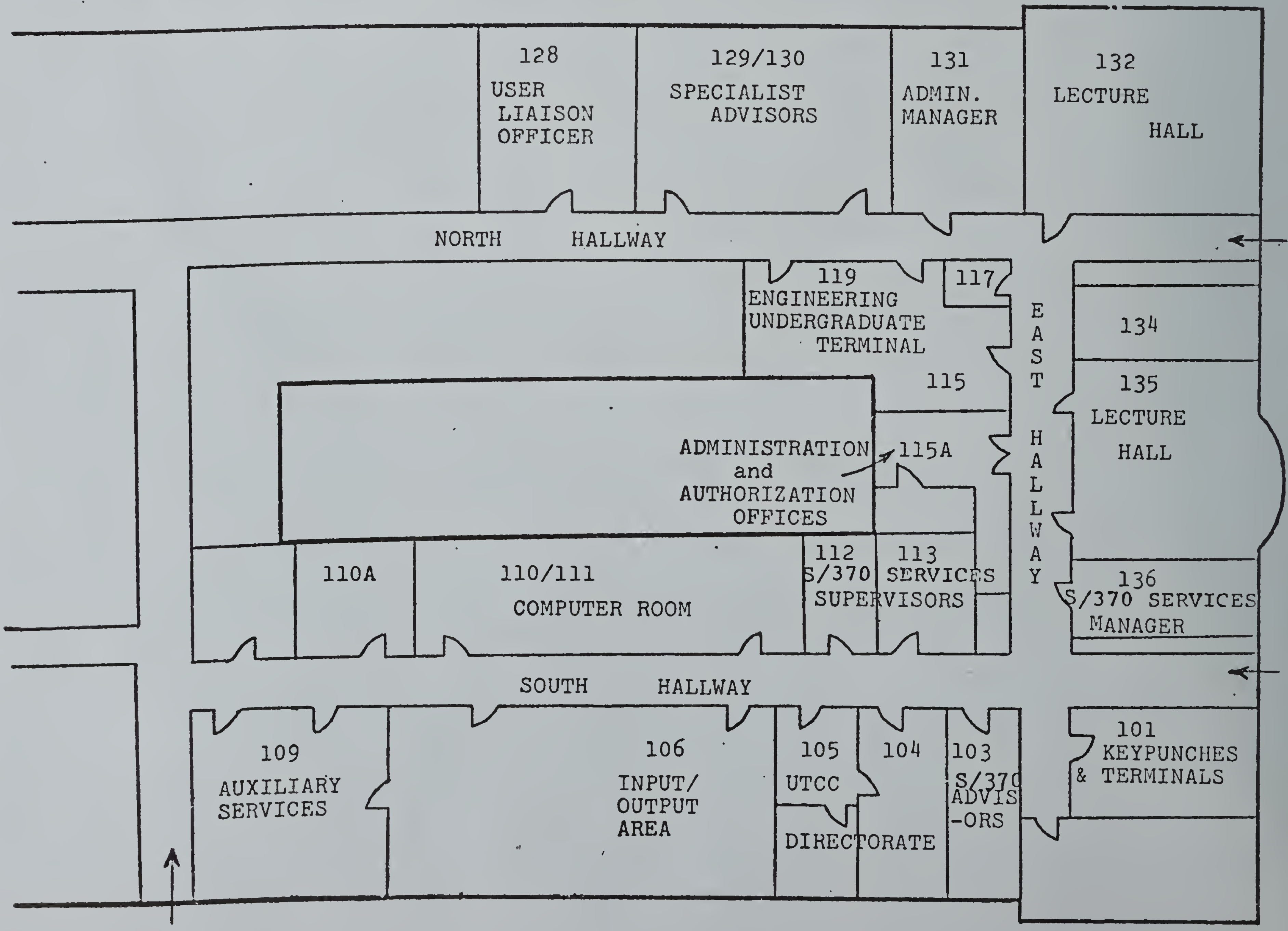




FLOOR PLAN: 12th FLOOR BURTON TOWER

FLOOR PLAN: UNIVERSITY OF TORONTO COMPUTER CENTRE
SANDFORD FLEMING LABORATORIES



PROJECTS FOR 1972: "KEEP IT MOVING!"

C.A. Ford

The new System/370-165 computer is now in its fifth month of service, although original plans had called for its delivery in June 1972. Production experience over these past few months seems to have more than compensated for any dislocation caused by moving the delivery forward by six months. System measurement and tuning projects have kept our technical staff occupied with machine. But what do we do for encores?

The most powerful single change to come for the UTCC S/370 will be the installation of the new 3330 disk drives. Four or more of these large capacity high performance drives may be installed before the end of 1972. Two or more 1600 b.p.i. tape drives would also be acquired at this time, necessitated both in support of the new disk drives as well as for the enhancement of the performance of user' tape handling jobs. Since new tape drives and disk drives will lead to still further increases in performance, there are plans afoot to increase the complement of line printers on the system.

Remote output facilities are also to be improved. By summer time the Arts & Science Undergraduate Terminal should be sporting a 2501-type card reader. This should improve handling ease at that terminal considerably. The Arts & Science terminal will also remain open during the summer this year. Software and communication equipment changes are in preparation for other remote terminals. Particularly, the recently installed Data 100 terminal at the Faculty of Management Studies will be speeded up. An IBM 1130 computer at the Faculty of Dentistry is also expected to be upgraded to become a terminal to our System/370.

Our Development staff is busy with a number of enhancements to the operating systems and the user utilities. Both SPITBOL and WATBOL, the Waterloo COBOL compiler, are being prepared to join the list of processors available in the High Speed Job Stream.

The staff of UTCC is also developing some functions and files within the APL file system to assist in the administration of users' accounts, tape inventories, etc. This is part of our project called "APriL". The project is based upon a concept of file management quite different from what are conventional notions of data base systems. As such, the project has strong experimental overtones. Our preliminary study indicates the technical feasibility of the new approach. The primary objective is to improve both administrative and technical support to our users. A secondary result may be the demonstration of a generally viable approach to management information systems through the medium of APL.

The installation of new disk drives on the System/370 will permit the relocation of one 2314 disk system to the Interactive System/360. This will provide for substantial growth in user data storage in support of APL, ATS, or CPS users.

The UTCC S/370 and S/360 systems are capable of supporting major increases in service to the users. Hardware, software and Centre management must all continue to develop in order to permit the exploitation of the potential of the systems. Thus the cry, "Keep it moving!".

SUGGESTIONS

Paula LoBello

The number of suggestions received this month decreased to 3, as compared to 44 for last month. They are quoted and discussed below:

Suggestion:	"Have IBM 519 Card reproducers print the interpretation on the card."
Reply:	"The 519 does not interpret cards. The two methods presently used are S/360-20 and 029 C2 keypunch. We are investigating a self service interpreting system for future use."
Suggestion:	"Don't use PLUTO until it operates properly!"
Reply:	"Because the PLUTO processor is the most recent addition to the high-speed system, it tends to have more 'bugs'. The developers of PLUTO are aware of the problem and attempting to solve problems as they arise. This method is diminishing the problems."
Suggestion:	"Have operators answer either the intercom or telephone to allow users to cancel the printing of 5-10,000 line jobs which have failed."
Reply:	"This will create no operational problems and will be done."

PERSONNEL CHANGES

Ann Herring

The Computer Centre is pleased to welcome Miss Terri Prescott, who joined the Development group this month. Terri is acting as clerk-stenographer to this area. Miss Nancy Gilbert has joined the S/370 Services group and is operating as clerk-stenographer in Room 136. Miss Pamela Stroud has joined the Liaison Office and will be the resident ATS expert.

Terminations from S/370 Services this month include Mary-Jane Reekie, Marilyn Chadee, Jim McKinlay and Al Storey.

Mrs. M. A. Rankin, for several years the Authorization Clerk in Room 115A and the girl all the users knew as the keeper of the codes, has forsaken the ranks in favour of peace and quiet in the distant fields of Oakville.

Mrs. Janet Marsh, technical writer, has been lured away from the Centre to a position offering more scope in Toronto's only other S/370-165 installation. UTCC publications will certainly miss her helpful work.

BULLETIN OF THE POLYTECHNIC INSTITUTE OF JASSY, ROUMANIA

C. A. Ford

Unbidden and unexplained, four sections of the 1971 Bulletins of the Jassy Polytechnic Institute arrived on your editor's desk. The Bulletin is comprised of many papers on the mathematics and computational techniques of mechanics. These papers have been written by many scholars in a number of languages.

Computer, mechanics and linguistics enthusiasts may find these documents of considerable interest. They have been donated to the Department of Computer Science Library for your pleasure.

NEWS FROM THE DEPARTMENT OF COMPUTER SCIENCE

C. Phillips

Software Engineering Seminar

The Department of Computer Science and the Computer Systems Research Group are jointly sponsoring an informal get-together of persons interested in software engineering, on May 30 and 31, 1972. Prof. D. Tsichritzis is organizing the seminar.

To begin the activities each day, a general lecture will be held at 11 a.m.

Tuesday, May 30 - "Structured Multiprogramming",
P. Brinch Hansen, Carnegie Mellon & Cal. Tech.

Wednesday, May 31 - "Fragmentation Planes in a Compiler",
William McKeeman, Visiting Professor from the University of California at Santa Cruz.

The afternoons will be devoted to informal discussion groups, including, but not limited to, the following:

"The Demon Problem" or "How to Build Virtual Machines" - Ric Holt

"Criteria for Software Implementation Languages" - Jim Horning

"Critical size for program maintenance" - Bill McKeeman

"System Modelling and Analysis" - Ken Sevciky

"Software Reliability" - Denis Tsichritzis

"Influence of Computer Hardware on Software Engineering" - Dave Wortman

Wednesday afternoon, many of the seminar participants will take the CN Rapido to Montreal for the CIPS Conference June 1, 2, and 3.

High School Students and the High Speed Job Stream

The Department of Computer Science and the Faculty of Applied Science and Engineering, in cooperation with the University of Toronto Computer Centre, are pleased to invite a number of students from each secondary school to use some of the computing facilities during the summer months.

As previously, the participating students are selected annually by their Computer Science teachers on the basis of their interest and ability in Computer Science. We are asking the teachers to issue authorization cards to the selected students. If you know of students who could benefit by using the computer, please request cards by writing to:

Mr. W. E. Greene
Liaison Officer
University of Toronto Computer Centre

The students selected are expected to exhibit some proficiency in computer programming, as instruction will not be generally available. On May 27 a session will be held for teachers in Room 132 of the Sandford Fleming Building at 10:30 a.m., in order to acquaint them with the terminal and procedures for running a job. It is hoped that many of the teachers can attend so that they may, in turn, instruct the students from their school on the specific aspects of the terminal.

We were gratified by the enthusiastic response by the teachers and students last year, and hope many will accept this renewed invitation.

Coming and Going

At the last Department Council meeting Professor Hull announced that Dr. Susan Gerhart has accepted a one year visiting appointment. She will work within CSRG as well as teach for DCS. Dr. Ron Baecher has been invited for 72-73 in the area of graphics, as Professor Mezei will be on sabbatical. In the area of Numerical Analysis, we are fortunate to be able to welcome Professor George Hall for the entire year and Professor David Handscome for a half year. Art Sedgwick has agreed to stay on until Christmas at which time his present plans indicate he will go to Australia. Wayne Enright becomes a member of the Scarborough faculty and John Metzger joins the Erindale faculty July 1, as assistant professors.

Prof. Ken Wright will return to Newcastle-upon-Tyne in July. He and his wife will take back a special souvenir of Canada, a new son born last month.

Professor John Mason resigns as of July 1. Everyone in the Department wishes him well. He will be missed, especially when it comes time to write the script for the Christmas Party.

High School Teachers Symposia

The third and last Saturday Symposium for secondary school teachers was held May 6. John Metzger gave a lecture on Modeling and Simulation in the morning. The teachers were given a program which simulated the population of an island inhabited by wolves. With access to the HSJS they were able to investigate the effect on the population by varying several parameters.

Thanks to Bill Greene and Bob Evans of UTCC for giving tours during the day.

THE DEPARTMENT OF COMPUTER SCIENCE LIBRARY

Recent Acquisitions in DCS Library

CANUNET Advisory Committee. A proposal for a Canadian university computer network (CANUNET) Edited by Universite du Quebec, March 21, 1972.

Conference on Software Protection, Brighton, Nov.1969. Software protection! the legal protection of computer programs. British Computer Society, 1970.

Gerald, Curtis F. Computers and the art of computation. Reading, Mass. Addison-Wesley, 1972.

Groner, Gabriel F. PL/I programming in technological applications. New York, Wiley-Interscience, 1971.

Harman, Alvin J. The international computer industry: innovation and comparative advantage. Cambridge, Mass. Harvard Univ. Press. 1971.

Lorin, Harold. Parallelism in hardware and software: real and apparent concurrency. Englewood Cliffs, N.J. Prentice-Hall, 1972.

Mendel, Jerry M. ed. Adaptive, learning and pattern recognition systems: theory and applications, ed. by J.M. Mendel and K.S. Fu. New York, Academic Press, 1970.

Rice, John R. ed. Mathematical software. New York, Academic Press, 1971.

Stuart, Fredric. WATFOR/WATFIV FORTRAN programming. New York, Wiley, 1971.

System /370-165 JOB VOLUME

C.A. Ford

The histograms (Figures A and B) and plots (Figures I, II and III) below show once again that the month of March was the big one for computer processing during the academic year. April, with "only" 40,216 general purpose and 74,460 high-speed jobs, is typically off the pace from the March figures of 48,358 and 112,242 jobs respectively.

The reduction in work on the general purpose stream has been accompanied by the use of lower priority levels. The "average" job is now costing about 90% of list price, as shown in the Overall Service Factor plots. A correlation between jobs per hour and OSF is again taking shape, duplicating the effect first demonstrated on the System /360-65 late last year (Newsletter No. 85, page 10). The performance improvement afforded by the System /370-165 can be seen by a glance at Figure II. (OSF is defined as the ration of actual job charges, priority factors included, divided by charges had only PR=6 (100%) been used. The plots are for the weeks since January 3, 1972.)

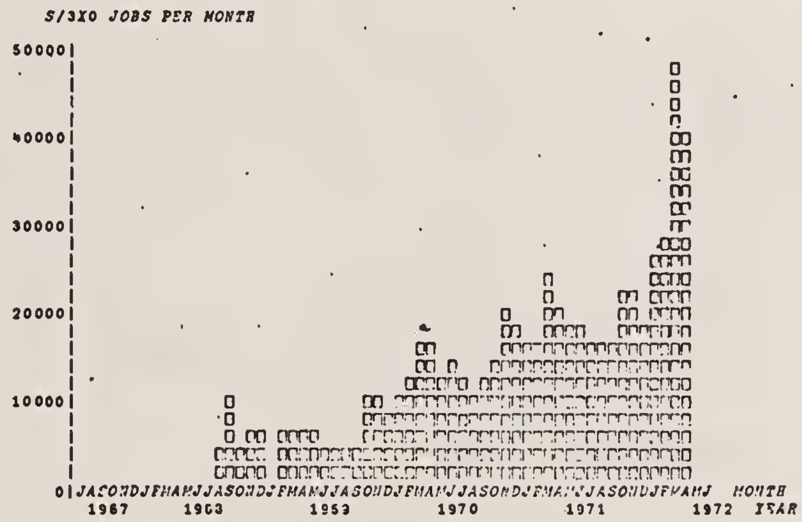


FIG. A

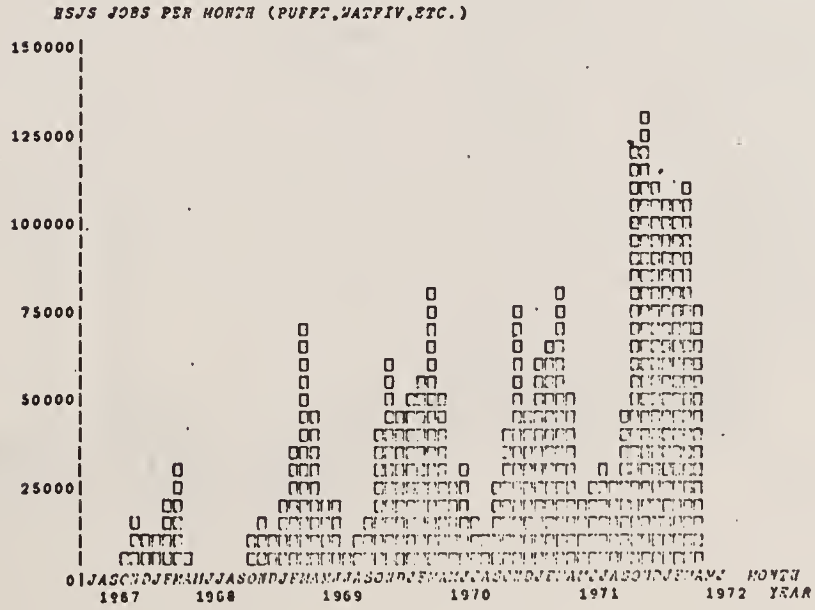


FIG. B

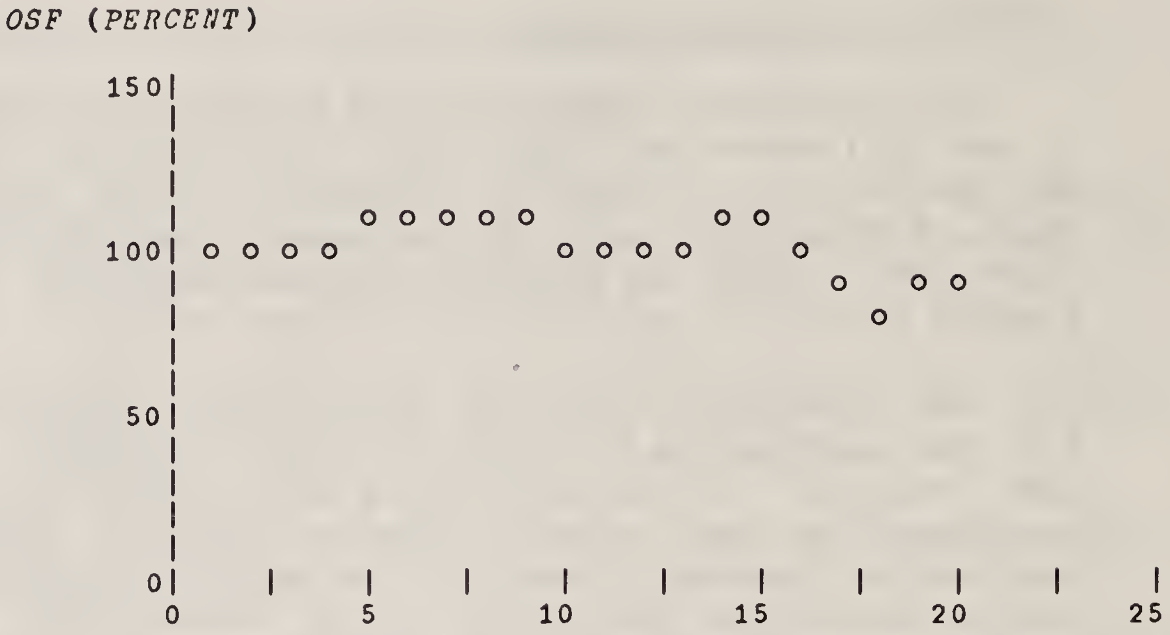


FIGURE I

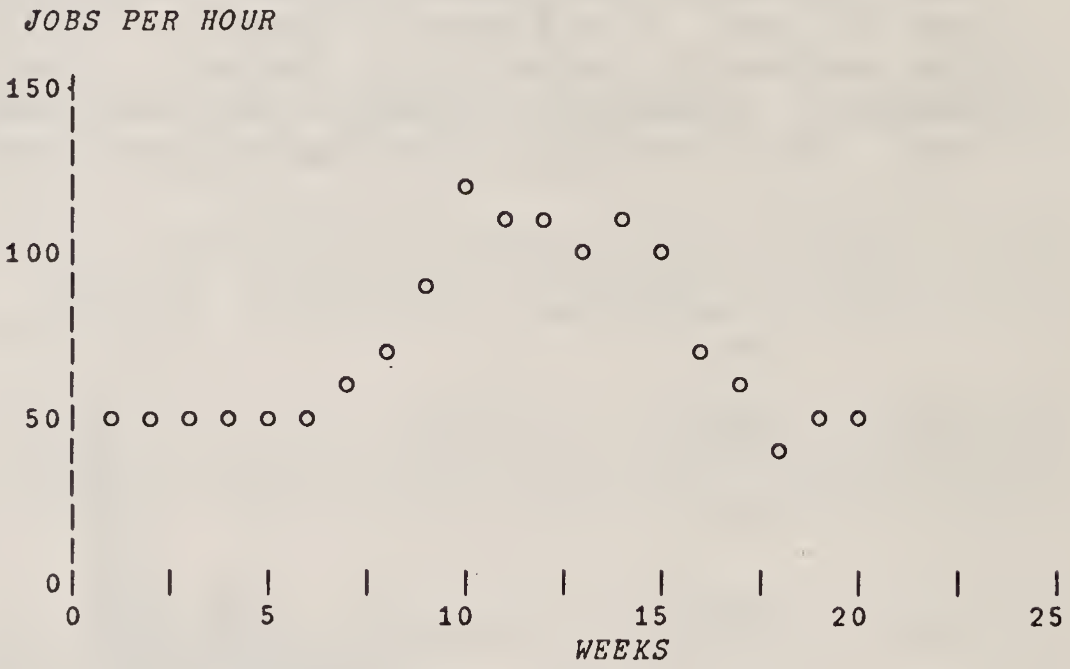


FIGURE II

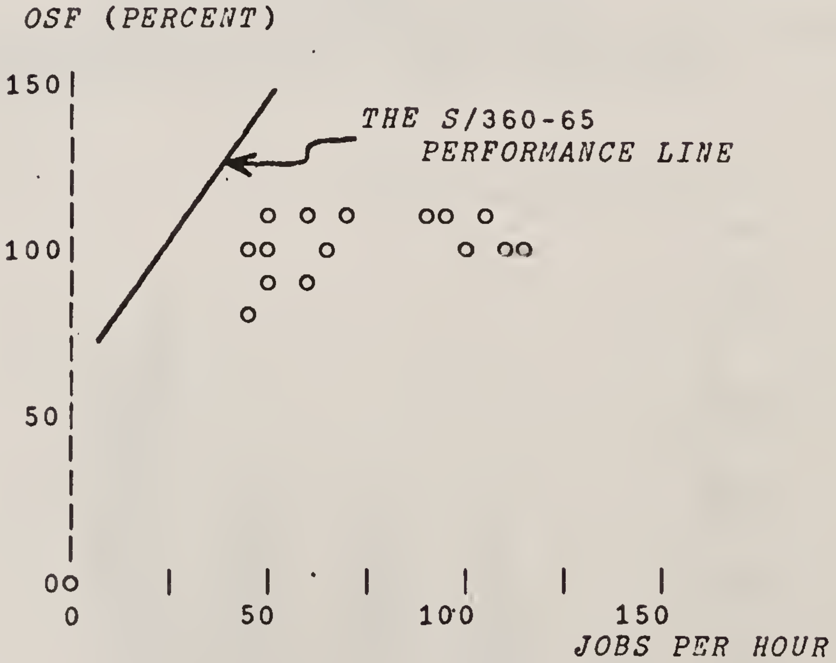


FIGURE III

PRODUCTION STATISTICS FOR HSJS

J. Lees

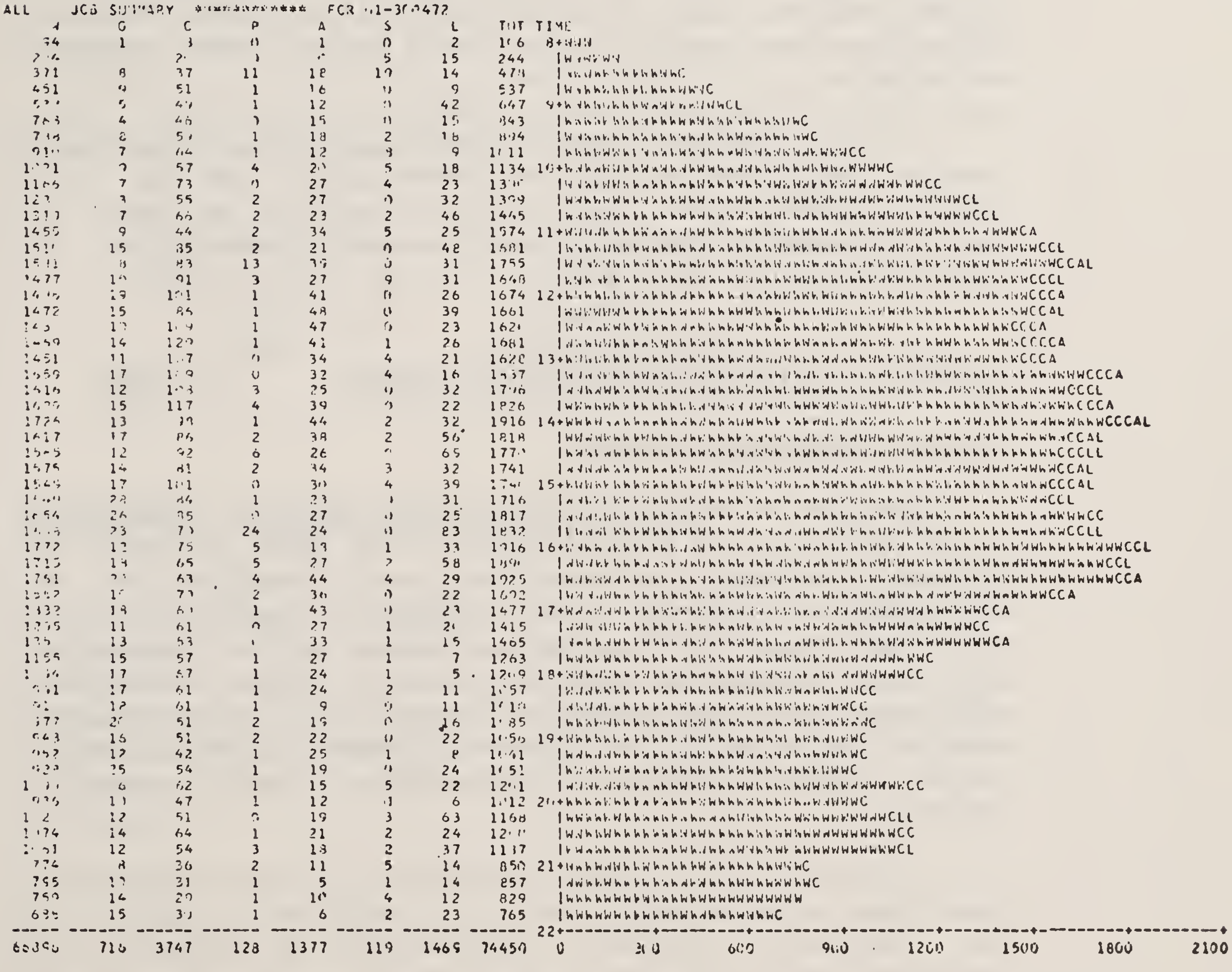
The accompanying histogram shows the total number of jobs processed through the High Speed Job Stream during the month of April.

Recall that the types of jobs are:

WATFIV (W), ALGOL W (G), PL/C (C),
ASMG (A), SIMON (S), and LIST (L).

63.5% of these jobs were run through the EUT terminal and 31.2% were run through the ASUT terminal. The remaining 5.3% were run from the other remote terminals through the System /370.

Of particular interest is the build-up to peak load at 11:00 A.M. and the consequent diminishing load starting at 5:00 P.M.



AUTH CODE SECURITY

R. Finlayson

The authorization code appears in several places on the input and output of the System /370 general purpose job stream. This code is the key to the use of the Computer Centre's equipment, and represents a resource of real dollar value. Therefore every precaution should be taken to prevent the misuse of any code.

It is necessary to punch this code on the user's part of the job card. However, you can disengage the print feature of the keypunch to make reading of the code more difficult. It is also advisable to remove the job card from any deck that is left in an accessible area.

On both printed and punched output the printing of the authorization code has now been suppressed. This was done in conjunction with self-service input/output which leaves output accessible to all users. Calcomp output, which is not for self-retrieval, has the authorization code printed on the plot. A lock character is available from the authorization clerk in Room 115 of the Computer Centre. This character is added to your code but is never printed on output.

If you suspect unauthorized use of your code please contact the authorization clerk immediately and she will either issue a lock character for your code or change the lock character if one is already present. Security of the code is up to the code holder.

SYSTEM /370 APPLICATION SOFTWARE SUPPORT

W. Hayes

Argonne Eigensystem Package

The second edition of this matrix package, eliminating a few errors in the first edition, has been released by Argonne National Laboratories and installed at the University of Toronto. The package, consisting of 34 subroutines and a control program, which allows the user to solve an eigensystem problem with a single subprogram reference, has been carefully tested at U.S. test sites and also at the University of Toronto. Messrs I. Farkas and C. Crawford have carried out the testing at the University of Toronto.

Most of the algorithms from which the subprograms were coded were constructed by Dr. J.H. Wilkinson, F.R.S., at the National Physical Laboratories in England, and represent the state-of-the-art for Hermitian and non-Hermitian eigenproblems. Timing studies on the System /370 indicate that Wilkinson's algorithms determine all algorithms determine all eigenvalves and eigenvectors of a symmetric matrix in double precision in half the time that the current version of the JACOBI routine takes for single precision calculation.

The routines in this package are now available in a newly created software library for Numerical Methods and Physical Science Applications. The contents of this library are classified under the following headings:

A. Integration/Differentiation
B. Differential Equations
C. Linear Equations
D. Polynominals
E. Special Functions
F. Interpolation/Approximation
G. Matrix Methods
H. Convergence
I. Applications

This library is stored on direct access storage devices and is accessible to any user of the General Purpose Job Stream. A table of contents listing and instructions for obtaining complete user documentation of any item in the library can be obtained by running the following CLASS=B job:

```
// EXEC RETRIEVE
//RETR.DATASET DD DSN=IC.MATHLIBD,DISP=SHR
//RETR.SYSIN   DD *
      column 10         column 16
      PRINT             MEMBER=CONTENTS
/*
//
```

STATISTICS ON CATALOGUED PROCEDURE USAGE

S. Yagi

As indicated in the last Newsletter, catalogued procedure usage statistics were gathered by means of unnecessary job steps initialized by calls upon the procedures. These "count" job steps are being removed this summer during a period of lower activity. New methods for gathering these statistics will be implemented in the future. Until then, these statistics will not be available.

SYSTEM STATUS BULLETINS ISSUED

R. Cox

24:72:1	New Utility Subroutine--UTTIME
25:72:1	New Graphics for CRJE users
25:72:2	Teletype Support for CRJE
26:72:1	Self-Service Input/Output--Room 106
27:72:1	Hours of Service--Victoria Day Weekend
27:72:2	Use of DISP=OLD
27:72:3	Use of SYSOUT=R Class

SYSTEM/360 RELIABILITY

S. Goldfarb

The following table summarizes the time lost out of scheduled hours of production for the period April 1, through April 30, 1972. The total number of scheduled hours of operation during this period was 470. There were no late starts (IPLs). The table shows the time lost due to system failures for each of the systems: four mischeduled IPLs were required as a result of the failures. The total losses represent 0.01% of the scheduled time for each of APL, ATS and CPS. The uptime for each of APL, ATS and CPS was 99.99%. (In addition to the scheduled hours of operation, APL ATS and CPS were each available during approximately 32 hours of unscheduled weekend time.)

DOWN TIME				
DATE	APL	ATS	CPS	REASON
Fri. Apr. 14	201	201	203	*Main storage check (hardware)
Wed. Apr. 19	11	12	13	*Power Fluctation
Thurs. Apr. 20	7	8	9	*Machine check (hardware)
Mon. Apr. 24	7	6	5	*Machine check (hardware)
	226	227	230	*indicates IPL required

SYSTEM FAILURES: APRIL 1 TO APRIL 30, 1972

CANADIAN RESTAURANT ASSOCIATION SHOW

A recent convention sponsored by the Canadian Restaurant Association and held at the Canadian National Exhibition included a booth demonstrating the use of APL in hotel registration and billing. The demonstrations were presented by members from the "School of Hotel Administration at Cornell University". In the interests of promoting APL, the Computer Centre aided the Cornell group through the loan of a terminal and an APL account; by all reports, the demonstration was a tremendous success.

FORTRAN PRE-PROCESSOR

J. Walton

We have a program under development which reproduces FORTRAN VI decks while making several of the changes required to translate later versions of the FORTRAN language to the 7094 subset. While not fully debugged, it is "operational". If you're interested, please visit the 7094 office, Room 1207, McLennan Physical Laboratories, Burton Tower.

DOCUMENTATION

J. Walton

A major overhaul of the 7094 user documentation is underway. If there are any topics you'd especially like to see covered, or treated in a certain way, or if you have any contributions or suggestions to offer, please let us know -- SOON!!

GENERAL NEWS

J. R. McBride

Accounting Changes

1) The I/O count for a job is now broken down by job-step, and printed at the end of each step.

11) The I/O charges for the 2250, the RADDT's and Star-Ring have been discontinued. The I/O charges for the 2250 and the RADDT's are covered by the interactive charge for these devices. The I/O charge for the Star-Ring is covered by the device charge for those devices being used on the ring, for example, PDP/8, Calcomp, etc.

Information Bulletin Index

A KWIC (Keyword in Context) index has now been prepared for all CRF Information Bulletins. The index is in three sections one for 1970 Bulletins, one for 1971 Bulletins and one for current 1972 Bulletins. The three sections are bound in one binder and are available for reference in the CRF Laboratory.

Visitors to the Laboratory

The following people visited the CRF Laboratory between April 1st and May 15th, 1972.

Mr. D. Brady (UTCC), Professor E. J. Davidson (University of Toronto) and guests, Professor T. V. Peucker (Simon Fraser University), Professor R. Baecker (University of Maryland), Dr. L. Schwartz (Bell Labs. New Jersey), Professor H. M. Albegov (Academy of Sciences, Moscow, U.S.S.R.), Miss L. Salienko (Society of Friendship, Kharkhov, U.S.S.R.) E. Britton (Planned Futures), J. Britton (HSC), Professor N. Baitm (University of Waterloo), Professor M. Blake-Knox (Carleton University, Professor G. Frieder (SUNY at Buffalo), Professor D. Grier (Cornell University), Dr. R. J. Ballantyne (McLaughlin Planetarium), Professor Y. Chu (University of Maryland).

CHANGES TO CRF DOCUMENTATION LIBRARY

J. R. McBride

The CRF Documentation Library is available to Users through the LDOC catalogued procedure. (This system was described in detail in IB21:71 and in "CRF Technical Tips for 1971.")

One change has been made and two new features have been added to the library. These are as follows:

i) Formerly copies of all of the CRF documents were filed in the SYS2.LINKLIB manual or the SYS2.MACLIB manual.

These two manuals have now been combined to form a new manual called CRF DOCUMENTATION. This exists in two volumes in which the documents are filed alphabetically. Volume I contains documents from A to I and Volume II contains J to Z.

ii) Each document in the library now has a document number of the form CRFnnnn, associated with it.

iii) A listing containing the document number, a one-line description of the program and the associated LDOC name is contained at the front of Volume I of the CRF DOCUMENTATION manuals.

The user may obtain a copy of this listing plus a KWIC (Keyword In Context) listing of the library contents by means of the following JCL:

```
// EXEC  LDOCX
```

For further information contact Ken Weir in Room SF2740 or telephone 928-5271.

UTCC DIRECTORY

	ROOM	PHONE 928-
DIRECTOR		
John C. Wilson	SF105	6496
ASSISTANT DIRECTOR		
C. Alan Ford	SF105	2991
USER LIAISON OFFICER		
Bill Greene	SF128	2694
ADMINISTRATION MANAGER		
Jerry Palter	SF131	8948
AUTHORIZATION CLERKS		
E. Schmutz	SF115A	8702
Cathie Pidcock	49 St. Geo.	8703
S/370 SERVICES		
MANAGER		
Dave McNaughton	SF136	6281
INPUT/OUTPUT SERVICES SUPERVISOR		
Roy Finlayson	SF112	7092
USER SERVICES SUPERVISOR		
Stan Yagi	SF112	7331
PROGRAM ADVISORS	SF103	8599
INTERACTIVE TERMINAL SYSTEMS MANAGER		
Sam Goldfarb	49 St. Geo.	3787
7094 MANAGER		
Joyce Walton	BT 1207	7094
DEVELOPMENT MANAGER		
Alan Wickens	49 St. Geo.	6135

- -

JOB STATUS QUERIES:	
SYSTEM/370	7373
7094	7094
Auxiliary Services	6465

INTERACTIVE TERMINAL SYSTEMS:	
System Status	6234
APL	7200
ATS	7100
CPS	6200

UTCC COMPUTER EQUIPMENT

(a) SYSTEM/370 MODEL 165

- located in SF 106/110/111
- provides General Purpose Job Stream and High Speed Job Stream services
- 2048K bytes of core
- 16 disk drives
- 1 drum
- 6 magnetic tape drives (4 9-track and 2 7-track)
- 6 display consoles
- 5 printers
- 4 card readers
- 2 card punches
- 6 remote terminals
- 1 paper tape reader

- OS/MVT with HASP and CRJE

(b) SYSTEM/360 MODEL 65

- located in Room 333 McLennan Physical Laboratories
- provides Interactive Systems service
- 1536K bytes of core
- 8 disk drives
- 2 9-track magnetic tape drives
- 1 printer
- 1 card reader
- 1 card punch
- 70 2741 typewriter terminals

- OS/MVT with APL, ATS, and CPS

(c) 7094 II

- located in Room 1203 Burton Tower
- 32K words of core
- 1 disk
- 8 magnetic tape drives
- input/output via a 1401 computer

UTCC AUXILIARY EQUIPMENT

- located in SF Room 109
- System/360 Model 20 for unit record services
- CALCOMP plotter (11" and 30")
- card sorter
- decollator
- 519 reproducing punch

UNIVERSITY OF TORONTO
COMPUTER CENTRE,
TORONTO, CANADA.

PROFESSOR D. A. MACRAE, CHAIRMAN,
DEPARTMENT OF ASTRONOMY,
ROOM 1403, MCLENNAN LABS.,
UNIVERSITY OF TORONTO.